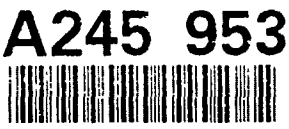


(2)

NAVAL POSTGRADUATE SCHOOL

Monterey, California

THESIS

FLEET REPLACEMENT SQUADRON
CONSOLIDATION:
A COST MODEL APPLIED

June 1991
by

Robert M. Maholchic

Thesis Advisor: Richard A. Harshman

Approved for public release; distribution is unlimited

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5 MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Naval Postgraduate School 6b OFFICE SYMBOL *(If applicable)* 55	7a. NAME OF MONITORING ORGANIZATION Naval Postgraduate School
6c. ADDRESS (*City, State, and ZIP Code*) Monterey, CA 93943-5000	7b. ADDRESS (*City, State, and ZIP Code*) Monterey, CA 93943-5000
8a. NAME OF FUNDING/SPONSORING ORGANIZATION 8b. OFFICE SYMBOL *(If applicable)*	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c ADDRESS (*City, State, and ZIP Code*)	10 SOURCE OF FUNDING NUMBERS Program Element No / Project No / Task No / Work Unit Accession Number

11 TITLE *(Include Security Classification)*
FLEET REPLACEMENT SQUADRON CONSOLIDATION: A COST MODEL APPLIED

12 PERSONAL AUTHOR(S) MAHOLCHIC, ROBERT M.

13a TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT *(year, month, day)*	15 PAGE COUNT
Master's Thesis	From To	1991 June	61

16 SUPPLEMENTARY NOTATION
The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government

17 COSATI CODES			18 SUBJECT TERMS *(continue on reverse if necessary and identify by block number)*
FIELD	GROUP	SUBGROUP	COBRA ,consolidation,cost estimates,cost model, Fleet Replacement Squadrons

19 ABSTRACT *(continue on reverse if necessary and identify by block number)*

The consolidation of Fleet Replacement Squadrons (FRS) represents one method of achieving planned force reductions. This thesis utilizes the Cost of Base Realignment Actions (COBRA) cost model to develop cost estimates for determination of the cost effective site location. The A 6 FRS consolidation is used as a case study. Data were compiled using completed Functional Wing studies as well as local information sources. A comparison between the cost estimates provided by the COBRA cost model for the alternate site locations is provided. Conclusions on the utilization of the COBRA cost model for the consideration of FRS consolidations and directions for future research are listed in the final chapter

20 DISTRIBUTION/AVAILABILITY OF ABSTRACT	21 ABSTRACT SECURITY CLASSIFICATION	
[X] UNCLASSIFIED/UNLIMITED [X] SAME AS REPORT [X] DTIC USERS	Unclassified	
22a NAME OF RESPONSIBLE INDIVIDUAL Harshman, Richard A	22b TELEPHONE *(Include Area code)* 408 646-2536	22c OFFICE SYMBOL AS/Hr

DD FORM 1473, 84 MAR — 83 APR edition may be used until exhausted; All other editions are obsolete

Approved for public release; distribution is unlimited.

Fleet Replacement Squadron Consolidation:
A Cost Model Applied

by

Robert M. Maholchic
Lieutenant Commander, United States Navy
B.A., University ofMaryland , 1974

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
June 1991

Author: Robert M. Maholchic

Approved by: Richard A. Harshman, Thesis Advisor

Paul M. Carrick, Second Reader

David R. Whipple, Chairman
Department of Administrative Sciences

ABSTRACT

The consolidation of Fleet Replacement Squadrons (FRS) represents one method of achieving planned force reductions. This thesis utilizes the Cost of Base Realignment Actions (COBRA) cost model to develop cost estimates for determination of the cost effective site location. The A-6 FRS consolidation is used as a case study. Data were compiled using completed Functional Wing studies as well as local information sources. A comparison between the cost estimates provided by the COBRA cost model for the alternate site locations is provided. Conclusions on the utilization of the COBRA cost model for the consideration of FRS consolidations and directions for future research are listed in the final chapter.

TABLE OF CONTENTS

I. INTRODUCTION

A. GENERAL BACKGROUND

In testimony before the Senate Armed Services Committee on 21 February 1991, Secretary of Defense Richard Chaney stated "The Cold War is over." [Ref. 1] He then proceeded to outline a strategy that will adapt the United States military to counter the evolving threats in the global community in the coming years. The plan calls for the Department of Defense (DOD) to reduce its force structure by 25 percent over the next five years. This equates to a reduction in personnel of 521,000 by the years 1995-1996. The restructured military that has been proposed is made feasible by the changed world situation but the current U.S. fiscal environment and concern for the deficit has also been in large part a driver of the strategy.

In order to be able to maintain a military force that is capable of defending U.S. interests in this time of drawdown, efficiency and effectiveness must be the rule in resource allocation decisions. There have been numerous methods advanced for achieving the proposed manpower savings. They range from the dramatic RIF (Reduction In Force) moves to attrition losses and recruiting cutbacks to consolidations of existing units. Each Military Department as well as the

Office of the Secretary of Defense (OSD) has developed contingency and action plans to obtain the required reductions in end strength.

In the spring of 1990, the Office of the Assistant Chief of Naval Operations for Air-Warfare (OP-05) proposed a consolidation of Fleet Replacement Squadrons (FRS) as a potential budget savings during the formulation phase of the Program Objective Memorandum (POM) FY-92 [Ref. 2]. This consolidation proposal was seen as producing both manpower and operating cost savings. The proposal was to combine the east and west coast FRS into a single site FRS for the A-6, E-2 and S-3 aircraft. The single site locations were: A-6 at NAS Oceana, Virginia, E-2 at NAS Miramar, California and the S-3 at NAS Cecil Field, Florida.

In order to obtain an accurate assessment of the proposal to consolidate the squadrons at a single site the Functional Wings (Funcwings) responsible for the respective east/west coast FRS were tasked to evaluate areas of potential impact at both the old FRS sites and the proposed single site FRS. Assumptions were provided as a basis for the study that reflected the current Naval Air strategy plan for that period. These included the Transitional Airwing concept and in the particular case of the A-6, that the A-12 transition schedule would occur as planned. The A-12 was to be introduced to the fleet as the replacement aircraft for the A-6. Critical to the A-6 single site proposal was the fact that the A-12 was to be

based at NAS Whidbey Island, Washington, the current location of the west coast A-6 FRS. However, in January 1991 the Secretary of Defense placed the A-12 acquisition contract in default for being over budget and behind schedule.

B. OBJECTIVES

The consolidation of similar training at a single location has the potential to produce savings in both manpower and operating costs. The focus of this thesis will be to consider approaches to the cost analysis requirements of consolidations and evaluate the Cost of Base Realignments Actions (COBRA) cost model as a tool of analysis in consolidations. In light of the current A-6/A-12 aircraft situation this thesis will re-examine the A-6 FRS consolidation by applying this DOD cost model to the specifics of the A-6 scenario.

C. RESEARCH QUESTIONS

The primary research question is: Is the COBRA cost model appropriate for use in identifying and evaluating costs/savings from a decision to consolidate training at a single site? Subsidiary research questions are:

- Does the model provide sufficient analysis detail (creditable quantifiable factors) to be usable to the decision maker in future single site consolidation reviews?
- When the model is applied to the proposed consolidation of the A-6 FRS what are the costs/savings realized?
- Does the model suggest an optimal cost effective location for the consolidation of the A-6 FRS?

D. SCOPE, LIMITATIONS AND ASSUMPTIONS

The main thrust of this study is to examine the Cost of Base Realignment Actions (COBRA) cost model as a tool for use in training unit consolidation actions, using the A-6 FRS as a case example. Therefore the specifics of only the A-6 FRS single site proposal as evaluated by the 1990 Funcwing studies and updated by current research will be utilized.

The primary assumption under which this thesis is written is that the A-12 will not replace the A-6 as the Navy's Medium Attack carrier aircraft as scheduled. No consideration has been given to a possible follow on replacement for the A-6. The specifics of the most recent base closures list (11 April 91) also have not been addressed. The conclusions presented are solely from the author's evaluation of the model. The intent is to show that the COBRA model is a valid cost analysis tool, useable by the decision maker to support realignment decisions.

E. METHODOLOGY

This thesis is an application of an approved DOD cost model. The model and the data utilized in the application was obtained from interviews with DOD officials and from the studies completed by the A-6 east and west coast Funcwings. A literature review and research was conducted on various approaches to cost analysis models/methodologies for evaluation of a consolidation scenario.

F. ORGANIZATION OF THE STUDY

This thesis is divided into five chapters, beginning with this introduction. Chapter II provides a literature and DOD operational policy review and an explanation of how the COBRA model was selected for use. Chapter III describes the COBRA model, its assumptions, inputs and outputs. Chapter IV has a description of the east and west coast A-6 FRS and presents the input data, the model output and discussion for the A-6 FRS scenarios. Chapter V summarizes the results and provides conclusions and areas for further study.

II. POLICY AND LITERATURE REVIEW

A. CURRENT GUIDANCE

Much has been written and numerous models exist on decision theory and on the allocation of resources in the public sector. In general, both academic and operational approaches agree that any decisions about the allocation of scarce resources between competing programs should be based on the principles of effectiveness and efficiency. DOD Instruction 7041.3, Economic Analysis and Program Evaluation for Resources Management provides the latest, though dated, (October 1972), policy guidance for the military departments. This operational approach requires that the guidance as given within the instruction, "...should be applied in comprehensive and continuous management reviews of the cost and effectiveness of resource requirements for both proposed and on-going activities." [Ref. 3:p. 1] It requires the use of economic analysis and program evaluations in these management reviews.

According to the instruction, in deciding on the use of resources the completion of an economic analysis/program evaluation should be considered as one of the inputs to a proper decision and not the decision process itself. The instruction provides lists and describes nine features that

should be considered and contained in any analysis. These nine features provide the building blocks of a model for use in the decision making process.

These features are:

- Objectives
- Assumptions
- Alternatives
- Cost Analysis
- Benefit/Output Analysis
- Rank Alternatives
- Risk/Uncertainty Analysis
- Constraints
- Sensitivity Analysis

Appendix A provides an in depth outline of these features with their important sub-elements as a tool of analysis.

Generally, when considering issues of unit consolidations it would be difficult, due to the number and complexity of factors, to show that any one factor in and of itself is consistently the ultimate decision criteria. Only after consideration of all pertinent data that is critical to the choice can a knowledgeable decision be made.

However, the development of an appropriate cost analysis is an essential feature of any economic analysis. It is important that the cost analysis be comprehensive enough to identify and quantify all the elements of costs involved in a

particular decision. It must be able to be applied in a consistent manner for all the alternatives under consideration. The level of complexity and detail of the cost analysis can vary though depending upon the decision makers's perspective.

The Office of the Chief of Naval Operations has two instructions that discuss the requirement for accurate and appropriate cost analysis/estimates as an important tool in the decision making process. OPNAVINST 7000.17A recognizes that "The need for a distinction between budget-quality cost estimates in programming and budgeting documents and the more tentative estimates which are appropriate for planning is clear." [Ref. 4:p. 2] In delineating staffing procedures for CNO/VCNO program decisions OPNAVINST 7040.5B requires "... complete, accurate, and standardized funding information...." [Ref. 5:p. 1] Both instructions identify standardized cost estimating categories. These categories are provided in Appendix B.

B. LITERATURE REVIEW

Other approaches to the economic analysis of the consolidation issue are suggested by the literature. Haggart [Ref. 6:p. 1-3] evaluates the advantages and disadvantages of using "cost per unit achievement", "comparable replication cost" and "incremental cost" in program cost analysis. Swope and Cordell [Ref. 7:p. 5-8] define "Fixed versus Variable

Costs" and Direct versus Indirect Costs" for identifying training resources. Massey, Novick and Peterson [Ref. 8:p. 10-13] discuss the "Total Program Cost Analysis" and the "Incremental Cost Concept" as methodologies of cost effectiveness analysis.

In any training or educational system the focal point and product of the system is the student. Whether the system output is one student or a squadron of trained pilots the primary factor is the student. Various methods of evaluating how well and to what degree a student is trained, how much it costs to train a student and ways to relate the effectiveness and costs have been proposed in the references mentioned above. Common throughout these approaches is the definition of the resources and cost generating activities required to reach the desired output. In the specific unit consolidation of the Fleet Replacement Squadron this first requires that the training throughput (student load) be determined for future years. Next, the resources required to meet the training throughput in instructors, staff and facilities are identified. This becomes the requirement. The alternative ways of satisfying the requirement can then be considered. First would be the status quo or dual site scenario. This is probably the easiest case to convert the resources required into a program cost since the operations are already established and operating. The multi-year measurement of the program cost becomes a matter of adjusting current costs for

increases or decreases in student load as well as application of inflation and discount rate values. This becomes the baseline case.

The consolidated unit alternative requires an assessment of the ability of a particular training site to meet the increased training requirements. This can lead to the evaluation of as few as one alternative location or as many alternative locations as can be identified. Most likely in the FRS situation only locations where current ability to support the specific aircraft would be considered. What has to be determined is the incremental change required over the present site capability.

In the case where the decision to consolidate has been made and the question to be determined is which site is most cost effective, the incremental cost to consolidate against the savings from consolidation at a particular location would then be considered. In effect a consideration of the return on investment.

C. SUMMARY

No matter which method to analyze training consolidation at a single site is chosen the issue is one that needs to be considered in a manner that provides the decision maker with information that will enable an informed choice. Any and all models of analysis of economic decisions are affected by a myriad of factors, from the varied and unique situations of a

particular project or program to the knowledge of long range planning goals.

However, the common link in any economic analysis framework is the cost analysis. It connects all the features of an economic analysis and provides the starting point for any alternative analysis. It should be able to identify and quantify all elements of costs (fixed, variable, direct, indirect, etc) that are important for the decision in question and provide those elements for consideration in a manner consistent with the needs of the decision maker. "Cost analysis is an analytical process employed to predict the resource requirements for weapon systems and programs." [Ref. 9:p. 2]

D. INTERVIEW AND RESEARCH RESULTS

The initial focus of research of this thesis was to attempt to identify the cost analysis requirements of the FRS consolidation issue. More specifically, a method was sought that would estimate the factor categories of personnel, facilities, transportation, and capital assets to achieve the expected dollar cost and eventual savings of the proposed consolidation. Interviews were completed with numerous DOD officials as well as a search of the literature for cost analysis models that would capture the complexities of this issue.

When the FRS consolidation issue was explained during an interview with cost analysis experts [Ref. 10] an immediate

answer of how to approach it was given. That answer was COBRA. The COBRA cost model was originally developed by the Logistic Management Institute (LMI) to link the criteria of military effectiveness and economic feasibility for the Secretary of Defense's May 1988 Commission on Base Realignment and Closure. Since its development, COBRA has been mandated for use by DOD as the model for evaluating closure or realignment actions in each subsequent base closure discussion. It is also used internally by the Military Departments to develop cost estimates for planned or possible consolidation/closure actions. However its use has been primarily limited to policy and planning staffs at the Pentagon or headquarters level. COBRA "...provides cost comparisons of proposed base realignment actions using data that was available to Service staffs without extensive field studies." [Ref. 11:p. 1-1] COBRA will provide the decision maker with information that will enable him to look at numerous features of the economic analysis framework as well as consider costing of the incremental change in resources required. The next chapter will describe the COBRA cost model.

III. THE COBRA COST MODEL

A. OVERVIEW

This chapter will describe the Defense Secretary's Commission on Base Closure cost model. In May 1988, Secretary of Defense Frank Carlucci chartered a commission to review the United States military base structure and recommend bases for realignment or closure. The Commission used a two-phased approach. First, bases were reviewed for military value. "Military value refers to how well a base meets the mission-related needs of the units or activities located there." [Ref. 12:p. 14] Bases were grouped into a number of categories, military value determined, and evaluated for excess capacity. These bases were then ranked in conjunction with the Military Departments and a smaller number of these bases were selected for the phase II process, the assessment of costs and savings of the closure and realignment options.

Phase II considered the environmental and economic impacts of these proposed closures and realignments. The COBRA cost model was the link between military effectiveness and economic feasibility for the commission. The COBRA model "estimates the cost of the major actions associated with the transfer of activities between bases and, if appropriate, the disposition of assets at closed bases." [Ref. 11:p. 1-1] COBRA was

originally developed using existing data from and in coordination with the Military Departments.

The Congressional Budget Office and the Government Accounting Office have both reviewed the model. GAO said the model "...is a conceptually sound tool for evaluating costs, savings and payback periods." [Ref. 12:p. 29] CBO, in testimony before the Military Installations and Facilities Subcommittee of the House Armed Services Committee stated that "The Commissions's cost model is a fairly comprehensive representation of the costs and savings involved in closing and realigning military bases." [Ref. 13:p. 545]

Following IMI development of COBRA each Military Department ran its "own" version of the cost model, utilizing service specific data for the standard factors tables. Base closures are one of the alternatives for achieving the desired force reductions proposed by Secretary Chaney. COBRA provides OSD with a common model for estimating the costs and savings from various base closure scenarios. The remainder of this chapter will provide a description of what COBRA can do, define the scenarios it can be applied to, and describe the assumptions, inputs, computations, and outputs used in the model.

B. WHAT COBRA DOES

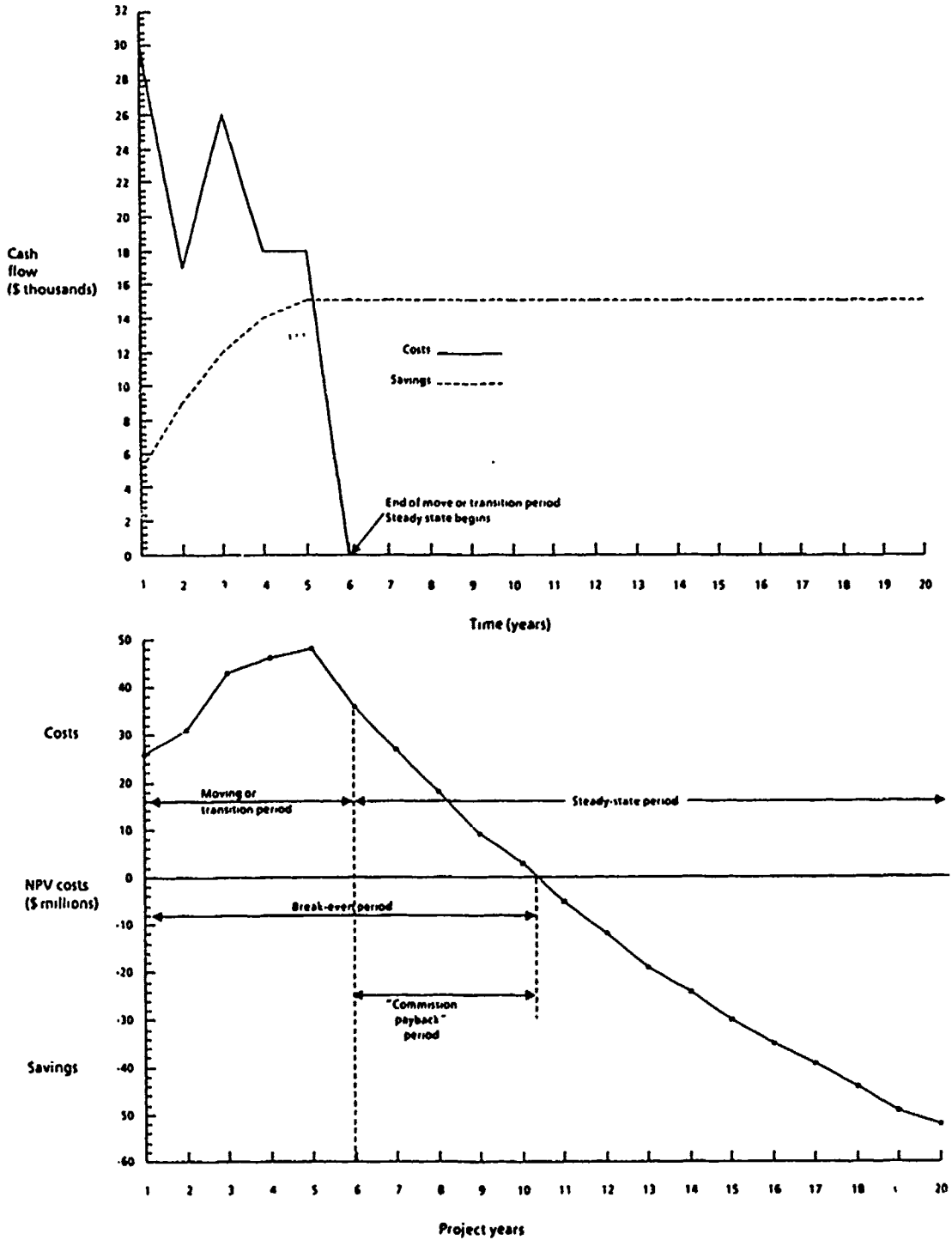
COBRA estimates the overall cost of, or savings achieved through a base closure or realignment in terms of several elements of cost. Some costs (or savings) are incurred

once as a result of a specific event; others occur as a result of a change situation and recur annually after the change is effected. In general, one-time costs and savings are determined by details of the proposed scenario (such as transporting a given quantity of freight over a specific distance) while the recurring costs and savings are created as a result of fundamental differences between the bases such as different per capita operating costs, different housing allowance levels, or a change in the total number of personnel required as a result of moving to the gaining base.

COBRA makes two types of calculations based on these two categories of costs and savings. One-time costs are computed as standard charges for item-by-item actions; in doing so, the model applies Service-wide standard costs and factors to scenario-specific inputs. Recurring costs and savings are computed by comparing the cost of specific services at the gaining and losing bases and predicting how much it would cost to perform the transferred services at the gaining base. Each service or action forms a cost element of the model.

COBRA calculates the one-time and recurring cost elements for each year, and sums them to determine a net cash flow. Present value analysis is applied to the cash flow and a payback period is determined. Figure 1 provides a graphical depiction of breakeven period, transition period, and payback period.

The breakeven period is the time from the beginning of the scenario until the total savings exceed the total costs. The transition period starts at the beginning of the scenario and continues until all the actions in connection with the transfers of activities are complete. As can be seen from the figure, the termination of the actions is clearly shown by the elimination of all one-time costs; all that remain are recurring costs, which stabilize at a given level for the scenario. This constant, enduring level portrays the steady-state savings or costs; clearly, the transition period ends and steady-state begin simultaneously. The payback period, then, as defined by the Commission charter, is the period between the achievement of steady state and the breakeven point. [Ref.11 p.1-5]



PAYBACK
FIGURE 1

C. SCENARIOS

COBRA is able to model three types of scenarios:

Closures, in which all the activities are transferred away from the losing base and the property is sold. Some costs are incurred to prepare the base for sale.

Deactivations, in which most of the activities are transferred away from the losing base, and a caretaker force is left in place to provide a minimal maintenance and security capability.

Realignments, in which some activities are transferred away from the losing installation but it continues to operate. In realignments, caretakers are not specifically accounted for, as it is assumed that existing tenants will be assigned to maintain excess space; and family quarters are filled by drawing families from off-base housing. [Ref. 11:p. 1-3]

D. ASSUMPTIONS

COBRA is a comparative tool. It does not attempt to portray budget quality data, and its assumptions make estimates for specific years imprecise. The inputs and outputs of the model are limited and defined by the assumptions of the model. It is a sophisticated assessment of the annually phased costs or savings attributable to base realignments or closures. While the model is not intended to provide exact budget estimates, the data is accurate enough to provide an in depth cost analysis and enable the rank ordering of realignment or closure scenarios for decision making purposes. The results of this discussion could then be refined for implementation into future budget proposals.

The use of standards in the COBRA model eliminates the need for extensive field surveys. Instead it uses standard cost estimate tables provided by the individual services or from sources such as housing surveys, published pay tables, or Defense Logistic Agency Data. The use of these standards assumes real data can be compressed into specific or arbitrary categories. The model encompasses sixty-seven standard factors broken into four major areas:

- Personnel
- Installation Support
- Transportation
- Construction

A listing of the standard factors and assumptions incorporated into the COBRA model are provided in Appendix C. Additional assumptions that were used in the model can be found in Appendix D.

E. INPUTS

The COBRA model requires data input in four categories to produce a scenario cost estimate. The data input categories are: Scenario Definition, Base Statistics, Construction Inventory and Other Input. These categories enable a detailed level of input as well as variability in the types of data considered. The variety of input requirements enable specific scenarios ranging from simple to very complex. This provides

a high degree of realism to the specific base closure site/location under review.

1. **Scenario Definition Inputs**

Scenario Definition Inputs are composed of user defined specifics on type of scenario, start dates, inflation and discount rates. Transfer data includes the cost of transferring personnel from the old to the new base. Position transfer data is used to determine the number of positions eliminated and changes in the number of personnel supported at each facility. Real property transactions involves facility square feet closed and real property purchase considerations.

2. **Base Statistics Inputs**

Base Statistics Inputs describe the bases involved in order to provide operating costs comparison. It considers the physical environment by inputs for gaining and losing base total military and civilian employment, housing unit vacancies and percentage of families living on base. Base expenditure input data captures information about both gaining and losing base costs for overhead calculations and activity mission costs that reflects the increased efficiency from the realignment or closure action.

3. **Construction Inventory Inputs**

Construction Inventory Inputs are used to systemically convert predictable space requirements at a gaining base into dollar value construction costs. The gaining area cost factor,

square footage requirements of the old and new base and excess capacity/rehabilitation requirements on the new base are considered.

4. Other Inputs

The Other Inputs category includes personnel costs (VHA, PCS per diem for officers and enlisted), cost avoidances (construction and procurement saved at the losing base), freight costs for transferring materials and supplies per ton-mile to the gaining base, and medical costs saved at the losing base (Champus for retirees). This category also allows inputs for the time phasing of construction at the gaining base and shutdown costs at the losing base.

F. COMPUTATIONS

The standard factors and assumptions are applied to the various input data and the model then computes both costs and savings. The one-time and recurring cost and savings are calculated by cost element for each year, then summed to determine the net cash flow. Present value analysis is performed on the net cash flow, as previously mentioned, to determine the payback period. The model categorizes costs and savings as either one time or recurring. One time if the cost or savings was the result of a specific event and recurring if they are the result of a changed situation and recur annually after the change is effected. The one-time and recurring costs and savings that are computed are provided in Appendix D.

In addition certain costs were not modeled because they were considered equal in all scenarios. They were:

- Non appropriated Funds Activities
- Base schools and schools aid impact
- Salary components of base overhead costs
- Costs of moving small activities[1]

G. OUTPUTS

Once the specific input data has been entered and the calculations completed the user is then offered a selection of output formats all derived from the net cash flow determination.

1. Realignment Summary

The key output is the Realignment Summary. It is a constant dollars summary of costs and savings in each year. (Savings are shown as negative numbers). The distinction between one-time costs and savings (construction, moving, other) and those which recur (mission, personnel, overhead) is accomplished through the arrangement of descriptive lines. The Summary will tell the user where the major influences of the scenario can be found. The key influences being the ones with the largest numbers.

---

[1]Activities with less than 100 military or 50 civilian employees

2. Additional Reports

Other reports available are a one-time cost report, freight, mission, personnel, a net present value summary and other reports. Each report format summarizes the respective costs and savings within a particular category.

H. SUMMARY

The COBRA model has incorporated a comprehensive set of cost categories and elements, based on standard factors and assumptions to produce its output. The use of this interactive computer cost model will provide the decision maker with an in depth cost analysis of various alternatives, enable the ranking of alternatives and permit the modeling of various "what if" scenarios (sensitivity analysis). COBRA is used by DOD to model the costs and savings for the on-going debate over base closings. It provides a tool for estimating the fiscal impact of various closure or realignment scenarios. The scenario modeled can range in complexity as entered by the user. The next chapter will describe the utilization of and the results from the application of the COBRA model to the specific scenario of the A-6 FRS consolidation issue.

IV. ANALYSIS OF FRS CONSOLIDATION

A. BACKGROUND

Appendix E provides all the data inputs utilized in the analysis by the COBRA model of the A-6 FRS consolidation. Before presenting the results of analysis, a brief description of the bases and fleet replacement squadrons involved as well as the specific scenario assumptions will be given.[2]

1. Attack Squadron One Two Eight (VA-128)

VA-128, the A-6 west coast fleet replacement squadron is based at NAS Whidbey Island, Washington, approximately 90 miles north of Seattle, Washington. Current manning is 117 Officers and 509 enlisted. There are also three direct support civilian positions. They occupy approximately 97,000 square feet of hangar/administrative and classroom space. VA-128 trains aircrew and enlisted maintenance personnel for eight fleet and six non-fleet squadrons. Its personnel occupy 210 base housing units and 200 Bachelor Enlisted Quarters rooms.

---

[2]The details of size, facilities, etc, were obtained from telephone conversations and extrapolated from data made available from numerous sources. The absolute accuracy of these numbers is not guaranteed.The use of these numbers is to illustrate the COBRA model only. The model enables the user to enter or change any of the numbers easily.

2. **Attack Squadron Four Two (VA-42)**

VA-42, the A-6 east coast FRS is based at NAS Oceana, Virginia, just outside of Norfolk, Virginia. Their current manning is 156 officers and 502 enlisted. They have no direct support civilian billets. They occupy approximately 71,000 square feet of hangar and administrative space. VA-42 trains aircrew and enlisted maintenance personnel for eight fleet and two non-fleet squadrons. Its personnel occupy 150 base housing units and 175 Bachelor nlisted Quarters rooms.

3. **NAS El Centro**

NAS El Centro is a 2289 acre base located in Southern California approximately 90 miles east of San Diego. Established as a Marine Corp Air Station in 1942 it was transferred to the Navy in 1946 and was used primarily as a bomber trainer base. Currently there are no active squadrons permanently based at El Centro. The Navy's Flight Demonstration Team has a training facility which is occupied from January to April each year. In addition, the Chief of Naval Education Training and the Medium Attack Funcwings maintain a permanent detachment at Nas El Centro. The Medium Attack Detachment is called Medium Attack Weapons Detachment (MAWD). MAWD supports VA-128 and VA-42 when those squadrons send detachments to NAS El Centro for weapons training (syllabus requirement) for approximately four weeks at a time.

MAWD occupies one hangar (50,000 sq ft) and has two officers and 120 enlisted permanently assigned.

B. SCENARIOS AND ASSUMPTIONS

As was mentioned in the squadron description, the FRS trains both aircrew and enlisted maintenance personnel for fleet and non-fleet squadrons. The aircrew trained are all officers, both Pilots and Naval Flight Officers (NFO). The aircrew instructors are all fleet experienced officer Pilots and NFOs. The maintenance training program is known as Fleet Replacement Aircraft Maintenance Personnel (FRAMP) training. The students are all enlisted personnel and the FRAMP instructors are all experienced enlisted personnel.

The aircrew and FRAMP training are essentially two separate schools under one command. There is virtually no training interaction between the aircrew and FRAMP personnel except for military formations and watch standing duties.The scenarios modeled are separated into the with FRAMP and without FRAMP categories to provide an example of a "what if" type of analysis. The ease of data entry for the COBRA model enables as many scenario variations as desired.

The assumptions utilized are a combination of requirements set by the original OP-05 message and funcwing studies. Modification of these assumptions would result in different cost estimates.

The scenarios modeled are broken into the following:

1. Consolidate all A-6 FRS training (aircrew and FRAMP maintenance) at VA-42. Personnel will be transferred to NAS El Centro to augment MAWD as required.

2. Consolidate all A-6 FRS training (aircrew and FRAMP maintenance) at VA-128. Personnel will be transferred to NAS El Centro to augment MAWD as required.

3. Consolidate only A-6 FRS aircrew training at VA-42. Personnel will be transferred to NAS El Centro to augment MAWD as required.

4. Consolidate only A-6 FRS aircrew training at VA-128. Personnel will be transferred to NAS El Centro to augment MAWD as required.

The following assumptions are common to all scenarios:

1. The consolidation will not be phased in but rather accomplished all at once through a transfer of personnel and equipment.

2. No additional Milcon will be available to facilitate FRS consolidation.

3. USMC A-6 training is not being considered.

4. NAS El Centro will remain open and MAWD will expand to support A-6 FRS training as required.

5. Existing fleet squadrons will utilize the vacated office and hangar spaces upon consolidation.

C. OUTPUT OF COBRA MODEL

The primary output of the COBRA model, previously discussed, is the Realignment Summary. For the ultimate "which one is cheaper" question, this is as far as the user need go. However by examining the numerous other output reports the decision maker is presented with a wealth of information on

where and what costs/savings are to be found. An analysis of the various output reports is presented below in Table 1A/1B. Table 1A is the consolidation scenarios with the FRAMP component included. Table 1B is the consolidation scenario without the FRAMP component.

OUTPUT SUMMARY
TABLE 1A

ONE-TIME COSTS/(SAVINGS)
(Dollars in Thousands)[3]

	SCENARIO ONE	SCENARIO TWO
MOVING		
PER DIEM	294	260
POV MILES	262	293
HHG	1706	1706
MISC	307	307
FREIGHT	127	127
MIL PCS SAVED	(777)	(777)
PERSONNEL		
CIV RIF	19	0
UNEMPLOY	6	0
PPS	25	0
ADMIN SUPPORT	345	345
TOTAL ONE-TIME COSTS	2314	2261

RECURRING COSTS/(SAVINGS)

PERSONNEL	Y1	Y2-6	Y1	Y2-6
HSG SUM	498	498	296	296
PCS	965	0	1251	0
HSG SAVED	(685)	(685)	(456)	(456)
SAL SAVED	(3252)	(6504)	(4517)	(9034)
TOTAL RECURRING SAVINGS	(2474)	(6691)	(3426)	(9194)
NET SAVINGS	(160)	(6691)	(1165)	(9194)

[3]For the remainder of the thesis all figures will be Dollars in Thousands and all savings will be in parenthesis.

OUTPUT SUMMARY
TABLE 1B

ONE-TIME COSTS/(SAVINGS)

	SCENARIO THREE	SCENARIO FOUR
MOVING		
PERDIEM	217	185
POV MILES	194	208
HHG	1347	1258
MISC	237	219
FREIGHT	97	97
MIL PCS SAVED	(599)	(555)
PERSONNEL		
CIV RIF	19	0
UNEMPLOY	6	0
PPS	0	0
ADMIN SUPPORT	345	345
TOTAL ONE-TIME COSTS	1863	1757

RECURRING COSTS/(SAVINGS)

PERSONNEL	Y1	Y2-6	Y1	Y2-6
HSG SUM	403	403	227	227
PCS	965	0	1251	0
HSG SAVED	(592)	(592)	(385)	(385)
SAL SAVED	(3234)	(6468)	(4517)	(9034)
TOTAL RECURRING SAVINGS	(2458)	(6657)	(3424)	(9192)
NET SAVINGS	(595)	(6657)	(1667)	(9192)

D. DISCUSSION

As can be seen from the output summary, the one-time costs from consolidating FRS training at VA-128, both with and without FRAMP personnel (scenario 2 and 4), are less than consolidation at VA-42 (Scenario 1 and 3). Likewise, the recurring savings calculated for year one and years two-six of

the consolidation shows greater savings by consolidating at VA-128. Therefore, based on the COBRA output, the least cost alternative identified is consolidation at VA-128.

However a consideration of what the COBRA model does not calculate in the consolidation scenarios needs to be addressed before a final conclusion can be reached.

1. **Personnel Costs**

Even though the COBRA model is quite comprehensive in its calculation of Permanent Change of Station (PCS) and Temporary Additional Duty (TAD) costs there were two types of these costs associated with moving personnel to and from this training unit that were not able to be modeled. COBRA is unable to model PCS and TAD costs for students whose ultimate squadron is non co-located with the FRS. These costs arise due to the length of training for the officer and enlisted students.

Officer aircrew are broken into categories depending on their level of experience in flying the A-6 aircraft. These categories are:

	Experience Level	Length of FRS Training
Cat I	None	38-40 weeks
Cat II	Previous tour not current in A-6	20-22 weeks
Cat III	Previous tour current in A-6	6-8 weeks
Cat IV	Senior aviator training	4 weeks

A Cat I/Cat II aircrew is sent to the FRS on PCS orders. Cat III/Cat IV aircrew are sent on TAD orders. FRAMP personnel average a 10.5 week training period. They are currently sent to the FRS on PCS orders as it is intended they will join a co-located fleet squadron. Under a consolidated FRS scenario with FRAMP included scenario the FRAMP student going to a non co-located fleet squadron would be sent TAD.

The distinction between the type of orders is based on the length of training. Generally, PCS orders are written for training or duty of greater than 90 days duration. TAD orders for less than 90 days.

a. Additional PCS Costs

COBRA only models the costs of PCS to move personnel to their new base. It assumes that once at their new location the personnel will remain at that location. In the case of consolidated FRS training, once a student completes his training he could be sent to a co-located squadron or a squadron on the opposite coast. For the Cat I and Cat II aircrew this would incur an additional PCS cost. This cost can be calculated using a COBRA standard factor as follows:

One-time PCS costs (officer) x number of Cat I/II PCS/FY

$7440 x 50 Cat I / 20 Cat II / Fy

This equates to:

$387 additional cost per year Cat I and
$155 additional cost per year Cat II

$542 Total PCS additional

*b. **Additional TAD Costs***

The additional TAD costs for Cat III/IV aircrew and FRAMP personnel also are unable to be modeled by the COBRA model. These costs could be calculated as follows:

TOTAL COSTS = TAD + TRANSPORTATION COSTS

TAD Costs = Per Diem rate x Length of training x Number of personnel

Transportation Costs = Number personnel x travel costs[4]

Cat III aircrew cost (avg 8 per year, avg training 60 days)

SCENARIO 1/3		SCENARIO 2/4
$44	TAD	$34
$5	Transp	$5
$49	Total	$39

Cat IV aircrew cost (avg 20 per year, avg training 30 days)

SCENARIO 1/3		SCENARIO 2/4
$55	TAD	$43
$13	Transp	$13
$68	Total	$56

FRAMP personnel cost (Berthing & messing available $15.50/day, not available local Perdiem)

---

[4]Travel costs equal $332 one-way airfare.

SCENARIO 1		SCENARIO 2
$750/4451[5]	TAD	$750/3435
$428	Transp	$428
$1178/4939	Total	$1178/3863

COST SUMMARY

	SCENARIO 1	SCENARIO 2
Cat I/II PCS	$542	$542
Cat III/IV TAD	$117	$95
FRAMP TAD (Mess/non)	$1178/4939	$1178/3863
TOTAL ADDITIONAL COSTS	Y1 Y2-6	Y1 Y2-6
	$1837 5598	$1815 4500

	SCENARIO 3	SCENARIO 4
CAT I/II PCS	$542	$542
CAT III/IV TAD	$117	$95
TOTAL ADDITIONAL COSTS	Y1-6	Y1-6
	$659	$637

The addition of these costs to the Output Summary total in Table 1 significantly changes the yearly net totals as illustrated below.

	SCENARIO 1		SCENARIO 2	
	Y1	Y2-6	Y1	Y2-6
NET SAVINGS (TABLE 1A)	(160)	(6691)	(1165)	(9194)
ADD PCS/TAD COSTS	1837	5598	1815	4500
NET COSTS/SAVINGS	1677	(1093)	650	(4694)

[5]For illustrative purposes messing not available used in out year calculation

	SCENARIO 3		SCENARIO 4	
	Y1	Y2-6	Y1	Y2-6
NET SAVINGS (TABLE 1B)	(595)	(6657)	(1667)	(9192)
ADD PCS/TAD COSTS	659	659	637	637
NET SAVINGS	64	(5998)	(1030)	(8555)

While the addition of these costs makes a significant adjustment to the costs/savings of the scenarios, the initial cost estimate relationship provided by COBRA still holds. The net costs in year one from consolidating at VA-128 with FRAMP (Scenario 2) are less than the net costs from consolidating at VA-42 (Scenario 1). The recurring savings are also greater from a consolidation at VA-128 than VA-42. Likewise, in a consolidation at VA-128 without FRAMP (Scenario 4), there are net savings in year one whereas at VA-42 (Scenario 3) there is a net cost. In years two-six, consolidation at VA-128 shows greater savings than at VA-42 without FRAMP (Scenario 3).

2. **Sensitivity Analysis**

As was mentioned in initially describing the COBRA model, the user is able to enter or adjust any data input to the model. The ease with which this can be accomplished readily lends the model to sensitivity analysis. Most simply, the user is able to modify any or all of the standard factors as desired. These modifications enable the development of a variety of "unique" standard factors patterned to the specific situation.

The definition of the specific scenario modeled is also a form of "what if" analysis. As was shown in this application the consolidation of the A-6 FRS was modeled as occurring with and without the FRAMP component. The resultant cost estimates provided output which enabled the decision maker to consider the fiscal implications of this strategy.

Likewise, the specific scenario assumptions utilized are another type of sensitivity analysis. In a realignment scenario such as the consolidation of a FRS, the COBRA model output readily breaks out the personnel and moving costs for comparison. In this particular example the scenario was simplified by the inclusion of the assumption that the consolidation would happen as a one time occurrence and not be phased in over a period of years. If the consolidation were to be phased in, the outyear savings numbers would be reduced by the inclusion of moving and personnel costs in each year of the phase-in action.

The assumption that no additional military construction money would be available to facilitate the FRS consolidation also simplified the resulting output of the model. The COBRA model converts the construction data elements inputs into costs and savings (if construction was avoided at the closing squadron) that would change the net results in both the first and outyears of the consolidation. It is conceivable that by varying the assumptions utilized in this A-6 FRS consolidation the results could vary significantly,

possibly even reversing the cost estimate relationships previously established. These particular assumptions were chosen because they were originally utilized in the evaluation of the consolidation proposal.

The next chapter will summarize the COBRA model, answer the research questions and suggest areas for further research.

V. SUMMARY AND CONCLUSIONS

The objective of this thesis is to evaluate the COBRA cost model as a tool of analysis in a FRS consolidation scenario. Chapter II detailed the DOD's current policy guidance on economic analysis for management reviews of resource requirements. Other approaches to the economic analysis of a consolidation scenario as suggested by the literature were identified.

A detailed description of what the COBRA cost model does, the scenarios it models, it assumptions, inputs and outputs was provided in Chapter III. Chapter IV detailed the background, scenarios and specific assumptions and results of the A-6 FRS consolidation as analyzed by COBRA. A specific cost element of the A-6 FRS consolidation that was not modeled by COBRA was explained and analyzed. The result of this analysis was the identification of the least cost location for consolidation of the A-6 FRS as VA-128 at NAS Whidbey Island.

This chapter will provide a summary of the COBRA cost model and answer the research questions. Areas for further research will be suggested.

A. SUMMARY

Originally the COBRA cost model was used to provide a cost estimate based on standard factors and assumptions that would enable the comparison of various closure and realignment scenarios during the May 1988 Defense Secretary's Commission on Base Closures. Its use was mandated by OSD for Military Department input on all subsequent base closure decision cycles including the most recent (April 1991) proposal.

COBRA provides a cost estimate useful in the planning stage of the proposed action. As it is based on standard factors and assumptions the output is not intended to be utilized as budget quality data. COBRA is not a "bottoms up" type engineering estimate. It will not provide the exact cost or savings to be realized from a particular action. However COBRA's cost algorithms give a very detailed estimate (albeit based on standard factors) of the types and the significance of the cost elements of a scenario. It is a very useful tool for its original intended purpose.

B. RESEARCH QUESTIONS

As a result of researching and using the COBRA cost model the research questions are answered as follows:

- The COBRA cost model is an appropriate tool for use at the planning stage for identifying and evaluating costs/savings in a consolidation decision.

The caveat provided in the summary above as well as in the COBRA literature about utilization of the output numbers as budget quality data apply. COBRA is an effective and useful tool at the planning stage in this decision.

- The model provides sufficient analysis detail to be useful to the decision maker in future single site consolidation reviews.

The cost elements as defined and delineated by the COBRA model will provide the decision maker with enough detail to enable him to determine the scenario drivers. The ease with which scenarios can be added or modified provides an invaluable "what if" or sensitivity analysis with resulting impact on specific cost elements/scenario drivers readily apparent.

- When the COBRA cost model is applied to the A-6 FRS consolidation, specific costs and savings are identified.

In the A-6 FRS consolidation scenario, as defined, the main cost drivers are related to personnel changes. Even though COBRA did not capture the additional PCS and TAD costs as mentioned, the initial cost estimate relationship as provided by the model were not changed by the addition of these costs. However the decision maker needs to be aware of or otherwise provide for consideration of these costs.

- The COBRA cost model clearly indicates an optimal cost effective location for the single site A-6 FRS.

The COBRA cost model provides a cost estimate for the scenario identified. For purposes of determining a cost effective location a level of benefit needs to be defined. When that level of benefit is considered to be the single site FRS, the comparison of the cost estimates for each of the alternative scenarios readily identifies the optimal cost effective location. In this particular analysis that location was determined to be VA-128.

C. AREAS FOR FURTHER RESEARCH

The following areas for further research are suggested as a result of working with the COBRA cost model on the A-6 FRS consolidation issue.

- Rerun the A-6 FRS consolidation on COBRA utilizing different scenarios and assumptions to determine what, if any is the reversal point for the single site location.
- Run the other proposed FRS consolidations, (E-2, S-3) to determine the optimal cost effective location for the single site location.
- Compare the cost estimates obtained from COBRA with the cost estimates developed by the respective funcwings.
- Explore the possibility of making COBRA a useful tool at the programming and budget formulation stage of a decision.

APPENDIX A

ECONOMIC ANALYSIS OUTLINE

This appendix provides an outline of DOD Instruction 7041.3, dated October 18, 1972.

1. OBJECTIVES
   - Clearly stated
   - Define purpose of program/project

2. ASSUMPTIONS
   - Explicit statements upon which analysis is based

3. ALTERNATIVES
   - Identified as present/proposed
   - Present-level of costs/effectiveness accrued without changing status quo
   - Proposed-level if action undertaken

4. COST ANALYSIS
   A. Cost Elements
      - Complexity and diversity dependent upon situation
      - Exhaustive to avoid double counting
   B. Sunk Costs
      - Already incurred at time of analysis
      - Not included in comparison of alternatives
   C. Costs
      1. Research and development
      2. Investment
      - One time
      - Need not occur in single year
      3. Recurring
      A. Personnel
      - Civilian/military pay/benefits
      - Other (travel,pcs,tad,etc)
      B. Operating (other than labor)
      - Materials, supplies, utilities, other services
      -Maintenance and repairs
      C. Overhead
      - attributable
      - changed by proposal
      D. Other
   D. Present Value
      - Timing of cash flows
      - Discount costs and benefits
   E. Economic Life

- Benefits considered for equal periods

F. Inflation-changes in purchasing power
   - Consider both:
   - Constant (w/o inflation) dollars
   - Current (w/ inflation Dollars

5. BENEFIT/OUTPUT ANALYSIS
   A. Output Measures
      - expressed quantitatively if possible
      - non-quantitative benefits specifically identified if pertinent to a decision
   B. Output Measurement Methodology
      1. Id all relevant outputs
      2. Establish data sources
      3. Collect, summarize, evaluate, validate and display output data
      4. Compare output data with costs

6. RANK ALTERNATIVES
   A. Least Cost Alternative (most efficient)
      - Same level of benefits
   B. Maximum Benefit Alternative (most effective)
      - Greatest level of benefits for a given level of costs (discounted)
   C. Unequal Benefits And Unequal Costs
      - no all-purpose criterion

7. RISK/UNCERTAINTY ANALYSIS
   - Expectation/probability that objectives will be realized by following a specific course of action

8. CONSTRAINTS
   - Limitations of proposed actions

9. SENSITIVITY ANALYSIS
   - Any factor, including side effects, that may impact on problem

APPENDIX B

COST ESTIMATE CATEGORIES

This appendix provides the cost estimate categories as described in Ref.4 and Ref.5.

CATEGORY	DESCRIPTION
CLASS A	DETAILED COST ESTIMATE (Post budget--contract estimates) Estimate based on contract plans and evaluation of firm quotations for major material items.
CLASS B	BID EVALUATION COST ESTIMATE (Post budget--contract estimate) Estimate based on contract plans and evaluation of contractor proposals in response to a request for a proposal.
CLASS C	BUDGET QUALITY ESTIMATE Estimate based on an engineering analysis of detailed characteristics of item under consideration.
CLASS D	FEASIBILITY ESTIMATE Estimate based on technical feasibility studies and/or extrapolated from higher quality estimates of similar items.
CLASS E	COMPUTER ESTIMATE Estimate developed usually by a computer model and based on cost estimating relationships and gross parameters.
CLASS F	BALL PARK ESTIMATE Quick cost estimates prepared in absence of minimum design and cost information and based on gross parameters.
CLASS X	DIRECTED OR MODIFIED COST ESTIMATE Estimate not developed by System Commands through normal cost estimating processes.

APPENDIX C

STANDARD FACTORS AND ASSUMPTIONS

This appendix provides a listing of the Standard Factors and Assumptions incorporated i: to the COBRA model as of 15 Feb 91

STANDARD FACTORS

A. PERSONNEL

Baseline Year	1992	
% Officers married	75.4	%
% Enlisted married	65.0	%
% Enlisted housing	68.00	
Officer Salary	68823.00	
Officer BAQ - w/depdts	6833.00	
Enlisted Salary	30307.00	
Enlisted BAQ - w/depdts	4221.00	
Civilian Salary	35687.00	
Normal Rotation, Civilian	8.88	%
Civilian Retirement	16.25	%
Priority Placement %	44.40	%
Civilian RIF pay factor	52.50	%
Civilian PCS Cost	50000.00	
% Civilian Quitting	6.57	%
Civilian Ann Leav Cost	3516.00	
Avg Unemploy Cost/Wk	218.00	
National Median Home Price	96700.00	
Home sale reimburse rate	10.00	%
Max Value	19249.00	
Home purch reimburse rate	5.00	%
Max Value	9624.00	

B. FACILITIES

RPMA Cost Indices (raise to power term)		
Acreage	0.0	
Buildings	1.0	
RPMA Cost Coefficient (multiplier)	4.1	
BOS Index (RPMA vs Population)	1.0	
BOS Cost Coefficient (multiplier)	1513.2	
Support for Move Factor	10.0	%
Caretaker Costs		
Admin space needs	58546.0	
Communications costs per sq ft	0.86	
% of original RPMA cost	5.6	%

C. TRANSPORTATION

Material per assigned person (lbs)	710.00	
Military light vehicle cost per mile	0.33	
Military vehicles cost per mile	0.76	
Shipping loss rate	2.0	%
HHG cost per cwt - pack	7.25	
HHG cost per cwt - store	14.10	
HHG cost per cwt - unpack	7.25	
HHG cost per cwt - misc	2.71	
HHG weight per officer family	14570	
HHG weight per enlisted family	8500	
HHG weight per military single	8000	
HHG weight per civilian	18000	
POV reimbursement per mile	0.23	
Air transport per passenger mile	0.12	
Misc expense per direct employee	700.00	
Civilian homeowning rate	64.0	%
Routine PCS costs/person/3 yrs	1773.48	
One time PCS costs		
Officer	7740.00	
Enlisted	4716.00	

D. CONSTRUCTION

Construction Types	SF Cost	
Horizontal (sq yds)	111.00	
Waterfront (lin ft)	72.00	
Air Operations	114.00	
Operational	109.00	
Administrative	82.00	
School Buildings	83.00	
Maintenance Shops	87.00	
Bachelor Qtrs	80.00	
Family Qtrs	47.00	
Covered Storage	52.00	
Dining Facilities	146.00	
Recreation	83.00	
Rehab Cost vs New Construct	70.0	%
IMA Percent	17.0	%
Design	15.1	%
SOIH	7.3	%
Contingency	12.3	%
SitePrep	22.5	%

ASSUMPTIONS

I. GENERAL
- A. Payback - OMB Circular A-94
  1. Inflation = 0%
  2. Discount Rate = 10%
- B. The following costs are not included
  1. MEDICARE
  2. Reuse planning
  3. Impact Aid
  4. No environmental cleanup
  5. No hazardous waste cleanup
- C. Other to be included
  1. Homeowners Assistance Costs
     a. Number leaving losing post
     b. Times Estimated devaluation - 15%
  2. Unemployment
     a. Number eliminated times
     b. 26 weeks times average unemployment
  3. Then year appropriations
     a. Inflation = OSD weighted table
     b. By appropriations.
  4. RITA
     a. Number civilians moving
     b. Times RITA rate times moving costs

II. DISTRIBUTION
- A. By user see Screen 8
  1. MILCON Direct input
  2. Shutdown phasing (Cumulative)
- B. By personnel moving

III. MISSION
- A. Assumed to be the difference from the gaining and the losing bases.
- B. O&M Cost/Savings
- C. Distributed by Personnel/MCA

IV. PERSONNEL COSTS
- A. Elimination costs/savings
  1. Military salaries saved
     a. Officer - 03 (w/Base pay, VHA, BAS, FICA, Retired Pay and Tax advantage)
     b. Enlisted - E4 (w/Base pay, VHA, BAS, FICA, Retired Pay and Tax advantage)
     c. Civilian - Annual compensation (base pay, funded and unfunded retirement benefits)
  2. Cost of Eliminated Military PCS
  3. Cost of Officer Severance Pay (Max of $30,000) [Will be 0]

B. Housing allowances
   1. Change in VHA rate of those off post now and will be off post at the gaining base. (Change in VHA rates)
   2. Cost of married (off/enlist) on post now being forced off at the gaining base after being put into available housing (vacant now and being built) times (VHA+BAQ) rates.
   3. Cost of single officer off base and going off base at gaining base.
   4. Enlisted single are assumed to live on base.
   5. If stationing is a transfer the model includes the savings of the people moving on base into the housing vacated by those being transferred.

V. OVERHEAD
A. Administrative and Planning Support is 10 percent of the total BOS for the first year and reduced by 25% each year thereafter.
B. BOS
   1. Uses BOS (non Payroll) actual as starting point
   2. BOS Delta calculated using an exponential curve based on population change.
C. RPMA
   1. Uses RPMA (non Payroll) actual as starting point
   2. Delta calculated using exponential curve based on acreage and installation square footage change.
D. Includes Mothball costs if closure.
E. Includes Caretaker costs if deactivated based on the number of caretakers, administrative needs, and communications costs per square feet. (Exponential)
F. Cost to maintain the space for transfer or deactivation is calculated based on a ratio of the sf shut down over the total sf times the RPMA (Non Payroll) budget times "Support for the Move Factor".

VI. NET CONSTRUCTION
A. Methodology
   1. Excess space first
   2. Rehabilitate space second
   3. New construction last
B. Assumes Excess space and rehabilitated space are contiguous.
C. Uses Tri-Services estimates for FY1992 budget
D. Uses Area Cost Factors to adjust Costs

E. Overhead
   1. Design - 10% (Put in first year)
   2. SOIA - 15%
   3. Contingency - 5%
   4. Site Preparation - 12%

F. Distributed by Personnel or MILCON

VII. MOVING COSTS

A. PCS costs for those personnel moving over 50 miles.
   1. PCS
      a. Military moving times per diem rate times Miles over 350 miles
      b. Civilian moving per diem rate times 30 days
   2. POV - Total moving times miles times POV rate.
   3. Civilian - Civilian times Civilian home-owning rate times:
      a. Home sale reimbursement: minimum of $17,813 or National home price times Area Cost Factor times Home sale reimbursement rate (10%).
      b. Home purchase reimbursement: minimum of $8,907 or National home price times Area Cost Factor times Home purchase reimbursement rate (5%).
   4. Household Goods
      a. People
         (1) Officer Married
         (2) Enlisted Married
         (3) Military Single
         (4) Civilian
      b. Cost per pound is HHG cost per pound + (freight costs per ton mile times distance/2000)
   5. Miscellaneous reimbursements times # moving.
   6. Civilian house hunting costs
      a. Transportation - Number moving times 2 people per trip times 2 (round trip) times distance times cost per passenger mile.
      b. Per diem - Gaining base per diem rate times 10 days times 1.75 factor.

B. Freight
   1. Packing, Unpacking other
      a. Assumes 710 pounds per moving person
      b. Uses HHG rate
   2. Freight - Adds above weight plus mission equipment and support equipment times the freight cost times the Distance times the percent moving to each base.

C. Vehicles heavy - Number times rate times distance

D. Vehicles light - Number times rate times distance times Percent this year.
E. Loss rate - (B+C+D) times loss rate (2 percent)

VIII. OTHER
A. CHAMPUS
1. Only apply if closed or inactivated
2. Only calculated increase at losing base
a. CHAMPUS inpatient cost per visit times visits
b. CHAMPUS outpatient cost per visit times visits
B. Civilian New Hire Cost - Number hired times $5,000
C. Civilian RIF Costs - Number riffed times Salary times Riff factor
D. Civilian Early Retirement Costs - Number early retired times Salary times Early Retirement Rate.
E. Land
1. Sales
a. Value of unimproved land
b. Year of closure
2. Purchases - first year
F. Environmental mitigation cost at gaining base - summed and prorated over first three years.
G. Procurement costs (O&M)
H. Other one times costs (O&M)

IX. BEYOND
A. Mission - same as mission year 5
B. Personnel - same as year 5 personnel with out:
1. Final PCS costs
2. Officer severance pay
C. Overhead - same as year 5 with out:
1. Shutdown costs
2. Administrative Planning & Support Cost
D. Net Construction will be 0
E. Moving costs will be 0
F. Other will only be CHAMPUS costs

APPENDIX D

COSTS AND SAVINGS

This appendix describes the costs and savings assessed by the COBRA model. [Ref.11:p.1-7,8]

ONE-TIME COSTS

- Personnel actions costs: severance pay, early retirement pay, new hiring costs
- Moving costs: per diem allowances, househunting costs, house sales allowances
- Transportation costs: air fares, automobile mileage allowances
- Freight costs: household goods, heavy equipment, miscellaneous
- Unique one-time costs: environmental mitigation, special equipment or transportation requirements
- New construction costs: planning/designing, constructing, repairing
- Shutdown costs

ONE-TIME SAVINGS

- Procurement and construction costs avoided
- Real property net proceeds

RECURRING COSTS AND SAVINGS

- Increased Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) costs
- Caretaker costs at the deactivated bases
- Changes in housing costs
- Salary savings after personnel reduction

- Changes in base overhead costs for the moving activities: Real Property Maintenance Activity (RPMA), Base Operating Support (BOS), Family housing

- Changes in mission costs resulting from mission operating efficiencies

APPENDIX E

SCENARIO DATA

The following are the data used as input to the COBRA model for the A-6 FRS consolidation.

A. PERSONNEL

	VA-42	VA-128	EL CENTRO
Military			
Officers			
Staff:	78	53	2
Student:	78	64	-
Enlisted			
Staff:	414	445	110
Student:	88	64	-
Civilians	-	2	-

B. FACILITIES

Hangar(sq ft)	54000	54000	50000
Administrative	20000	40000	10000
Classroom	1000	3500	---
TOTALS	**75000**	**97500**	**60000**

C. HOUSING

# Families in Base Housing	150	210	50
# BEQ Rooms	175	200	55

D. PERSONNEL COSTS

Officer VHA	70	74	73
Enlisted VHA	137	110	139
Per Diem Rates	92	71	74

E. DISTANCE

From	To	Miles
VA-42	VA-128	2955
VA-42	EL CENTRO	2700
VA-128	EL CENTRO	1200

LIST OF REFERENCES

1. Secretary of Defense Richard Chaney, Testimony before the Senate Armed Services Committee, Washington, D.C., 21 February 1991.

2. COMNAVAIRPAC San Diego, Ca., Naval Message, Subject: *Single Site FRS Proposal*, 171801z Jul 90.

3. Department of Defense Instruction 7041.3, Subject: *Economic Analysis and Program Evaluation for Resource Management*, 18 Oct 1972.

4. Chief of Naval Operations Instruction 7000.17A, Subject: *Cost Analysis*, 15 Sep 1976.

5. Chief of Naval Operations Instruction 7040.5B, Subject: *Staffing Procedures for Proposed Programs Requiring CNO/VCNO Decisions*, 2 May 1983.

6. The Rand Corporation, *Program Cost Analysis in Educational Planning*, Sue A. Haggart, Dec 1971.

7. Training Analysis and Evaluation Group, *Training Resource Classification : Direct-Indirect and Fixed-Variable Cost Categories*, W.M.Swope and C.C.Cordell, June 1976.

8. The Rand Corporation, *Cost Measurement: Tools and Methodologies for Cost Effectiveness Analysis*, H.G.Massey, D.Novick and R.E.Peterson, Feb 1972.

9. Secretary of the Navy Instruction 7000.19B, Subject: *Department of the Navy Cost Analysis Program*, 12 March 1975.

10. Interview between W.Marsch, Lieutenant Colonel, USAF, Air Force Cost Center, and the author, 26 Feb 1991.

11. Logistic Management Institute, *COBRA: The Base Closure Cost Model*, Douglas M. Brown, May 1989.

12. GAO/NSIAD -90-42, *Military Bases, An Analysis of the Commission's Realignment and Closure Recommendations*, U.S. Government Printing Office, Nov 1989.

13. U.S. House of Representatives, H.A.S.C. No. 101-21, *Report of the Defense Secretary's Commission on Base realignments and Closure*, U.S. Government Printing Office, 1989.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Technical Information Center Cameron Station Alexandria, Virginia 22304-6145	2
2.	Library, Code 52 Naval Postgraduate School Monterey, California 93943-5002	2
3.	Defense Logistics Studies Information Exchange U.S. Army Logistics Management Center Fort Lee, Virginia 23801-6043	1
4.	Naval Center For Cost Analysis Director (NCA) Crystal City Gateway #4 Arlington, Virginia 22202	1
5.	Professor Richard A. Harshman, Code AS/Ha Department of Administrative Sciences Naval Postgraduate School Monterey, California 93943-5000	1
6.	Professor Paul M. Carrick, Code AS/Ca Department of Administrative Sciences Naval Postgraduate School Monterey, California 93943-5000	1
7.	Office of the Chief of Naval Operations Navy Department (OP-05C) Attn: LCDR R.M. Maholchic Washington D.C. 20350	1